Constant effects on variants in controlled judgment data[*]

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Abstract

This article proposes that Kroch's (1989) Constant Rate Hypothesis—the generalization that contextual effects tend to be stable in processes of diachronic variation in production data—be extended to synchronic variation in controlled judgment data. Two recent, large-sample judgment experiments are discussed suggesting that shared contextual effects across speakers in acceptability judgments can be used to infer a single abstract source for patterns of variation across superficially different contexts.

1 Introduction

An important accomplishment of modern diachronic syntax has been the discovery of a generalization, originally due to Kroch (1989), about the stability of contextual effects on variation in processes of syntactic change as manifested in production data. Kroch's insight, the *constant rate hypothesis*, was that for any single abstract process of syntactic change, surface contextual effects tend to be constant across the trajectory of the change. A parsimonious explanation of these facts, Kroch suggested, was that syntactic change applies at an abstract level, i.e. affecting structural representations rather than surface strings. Constancy in contextual effects, according to Kroch, reflects the fact that, in the general case, learners faithfully acquire (grammar-external) probabilities over contextual conditions on the use of abstract forms. Grammatical change reflects incremental change in the probability of use of one abstract representation vs. a competing one—"grammar competition" in Kroch's terms. In related work, Guy (1980; 2007) has proposed that within a given dialect, constancy in contextual effects applies across speakers to processes of variation more generally, the *shared constraints hypothesis*. That is, shared probabilistic

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[*]Many many thanks to . . .

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constraints on variation within a dialect/population are visible not just in diachronic processes but in synchronic variation as well.

Constant rate effects have been reported in a now considerable body of production studies of syntactic change (Santorini, 1993; Ball, 1994; Kroch, 1994; Pintzuk, 1999; Cukor-Avila, 2002; Kallel, 2007; Durham et al., 2011).[1] To date, however, very little work has explored the implications of Kroch's generalization beyond production-based studies of syntactic variation and change. Recent results indicating that acceptability judgments closely mirror relative probabilities of semantically equivalent competing forms in production suggest that constant effects may also apply in judgment data (Bresnan and Ford, 2010; Melnick et al., 2011). In this article, we propose that controlled judgment data can be used to measure constancy in contextual effects in synchronic variation and to identify different grammars posited by learners (Tortora and den Dikken, 2010). We describe two large-sample judgment experiments lending plausibility to this approach.

The discussion is organized as follows. In section two, we describe an experiment with 297 subjects examining the effect of object weight on word order in English verb particle constructions in American and British English. In section three, we describe effects of voice and object shift on theme-goal ordering in ditransitives in Norwegian, in an experiment with 500 subjects.

2 Object weight effects on word order

In this section, we describe a study of regional and grammatical effects on the English particle verb alternation first reported in Haddican and Johnson (2012). We illustrate this variation in (1), which shows that, with a class of transitive verb + particle combinations, the particle may appear either immediately to the right of the verb, before the direct object, or further to the right, following the direct object. We refer to these word orders as the VPO (verb-particle-object) and VOP (verb-object-particle) orders respectively.

(1)   a.   She cut open the melon.   (VPO order)
       b.   She cut the melon open.   (VOP order)

Most formal work on the variation illustrated in (1) takes the two variants to be transformationally related in view of the fact that the thematic interpretations of the two variants are identical. In particular, there are two main approaches to the alternation. One approach takes the VPO order to be underlying, often with the verb and particle merged as a "complex head" taking the object as its complement (Johnson, 1991; Dehé, 2002). On this approach, the VOP order is typically derived by movement of the object to a position above the V+P complex head, followed by "excorporation" of the verb to a position to the left of the object. A second approach takes the VOP order as underlying, with the object and particle merged in a small clause structure (Kayne, 1985; Den Dikken, 1995, 2010; Svenonius, 2010; Haddican and Johnson, 2014). On this approach, the VPO order is typically derived via raising of the particle into some higher position above the object. The present discussion will not require us to take sides in this debate. For our purposes, what will be crucial is the fairly standard assumption that the variants are related via an abstract process—a movement rule in the syntax.

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[1]See also Fruehwald et al. (2009) for evidence of constant rate effects in processes of phonological change.

Much of the formal and sentence processing literature on English particle verbs has focused on two kinds of linguistic constraints on word order. One set of studies has discussed the length, or prosodic weight, of the object as a processing or a phonological phrasing constraint on word order. Kroch and Small (1978); Gries (2001) and Lohse et al. (2004) all report evidence from corpus studies showing that "heavy" objects such as those in (2) tend to favor the VPO order.

(2) a. She turned off the fan I bought her for Valentine's Day.   (VPO order)
     b. ?She turned the fan I bought her for Valentine's Day off.   (VOP order)

With lighter objects as in (3), on the other hand, the VOP order is no longer disfavored.

(3) a. She turned off the fan.   (VPO order)
     b. She turned the fan off.   (VOP order)

Indeed, speakers generally find the VOP order obligatory when the direct object is an unstressed, weak pronoun, as in (4).

(4) a. *She turned off it.   (VPO order)
     b. She turned it off.   (VOP order)

Lohse et al. (2004) explain the object length effect in terms of a more general processing constraint, namely that processing is facilitated when the material intervening between members of a syntactic dependency is minimized. In the case of VOP orders but not VPO orders, heavy objects as in (3) incur a heavy processing cost on this approach because they create a large gap between the two elements in the particle verb dependency. VPO orders are therefore preferred in proportion to increasing object length, not because the VPO orders become easier to process, but because the corresponding VOP orders become harder to process as object weight increases.

A second set of studies has focused instead on information-structural constraints on word order. Bolinger (1971), Svenonius (1996), Kayne (1998), and Dehé (2002) note that given objects, or topics, favor placement further to the left, as found in the VOP order, while focused objects favor placement further to the right, as in the VPO order. This information-structural effect on particle verb variation is discussed in Haddican and Johnson (2012) and Haddican and Johnson (2014). Here we will focus on the effects of object weight.

A further goal of Haddican and Johnson (2012) was to test Hughes et al.'s (2005) claim of a dialectal difference in word order preference. Based on anecdotal evidence, Hughes et al. (2005: 23) propose that Scottish speakers tend toward VPO orders, while speakers from the south of England tend toward VOP forms. Based on limited historical corpus evidence, Elenbaas (2007: 273-279) speculates that in the early Modern English period, VPO orders were favored in areas most exposed to Scandinavian varieties, that is, the Danelaw in Northern and Eastern parts of England, while VOP orders were favored elsewhere.

Haddican and Johnson (2012) suggested that if these claims for British English were true, there might be corresponding differences in American English. For example, if Scotland tends towards VPO, so might areas of the U.S. Midland with heavy Scottish and Scots-Irish settlement patterns. And if Southern England favors VOP, areas mainly settled from there, like New England, might share this preference. In fact, combining

the experimental data with geographically-targeted Twitter data, Haddican and Johnson (2012) found no evidence of regional differences within either country, but did find a clear difference between American subjects (who preferred VPO) and British subjects (who preferred VOP). Canadian and Irish subjects were generally intermediate. For this reason, while not excluding the other nationalities, the present study focuses on the American and British subjects, who showed the clearest contrast in this regard.

Subjects. Subjects for the experiment were 297 self-described native speakers of English recruited online through personal contacts of the authors. 126 of these were from Great Britain (England or Scotland), 113 were from the United States, 32 were from Canada and 26 were from Ireland. Almost all had BA/BS-level degrees or higher. Subjects ranged in age from 18 to 84 (mean = 30). 63% were women.

Materials. The experiment crossed three within-subjects factors, each with two levels: particle-object order, object length and focus status of the object. In this report, we will essentially ignore the focus condition.[2] The word-order factor had the levels VPO and VOP, as illustrated in (1) above. Object length was operationalized as a binary factor: "short" objects were all three-syllable constituents with the definite article and a two-syllable noun, e.g. *the melon*; "long" objects were all seven-syllable DPs with a definite article, two two-syllable adjectives and a noun, for example *the heavy juicy melon*.

Fully crossing these three binary factors yields eight conditions, but combining the data across the focus factor reduces the number of conditions to four, which we illustrate in (5)–(8).

(5) Her kids wanted a snack, so Andrea cut open the melon.
     (VPO order, light object)

(6) Her kids wanted a snack, so Andrea cut open the heavy juicy melon.
     (VPO order, heavy object)

(7) Her kids wanted a snack, so Andrea cut the melon open.
     (VOP order, light object)

(8) Her kids wanted a snack, so Andrea cut the heavy juicy melon open.
     (VOP order, heavy object)

Procedure. 32 lexicalizations were created, using particle verbs that were all non-aspectual and compositional, as classified by Lohse et al. (2004). The lexicalizations were blocked and assigned to lists by Latin square, such that each subject saw all 32 lexicalizations, eight in each of the four conditions. Random assignment of subjects to lists ensured that there was no overall correlation between lexicalization and condition. The 32 experimental sentences in each list were pseudo-randomized within blocks with 32 filler sentences, half grammatical and half ungrammatical.

Subjects judged each of the sentences in a self-paced online judgment experiment using Ibex Farm (Drummond 2011). The experiment was anonymous and subjects were neither paid nor did they receive academic credit for participating. Subjects rated each sentence on an 11-point scale by clicking an icon for a value ranging from 0 to 10 in a horizontal array, with the endpoints labeled "Bad" and "Good" respectively.

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[2]The effects of word order and object length on acceptability were very similar in the two focus conditions. Any differences between lexicalizations with respect to focus were corrected for, as described below.

Results and discussion. The data for each subject were normalized by converting to z-scores, subtracting the mean and dividing by the standard deviation of the ratings of the 32 filler sentences. Since half of the fillers were ungrammatical, the experimental sentences with particle verbs tended to have positive z-scores (with an interquartile range between +0.37 and +0.94 units).

Using the lme4 package in R, we then divided the data by focus condition, and fit two separate linear mixed-effects models, with the normalized acceptability judgment as the response, and weight * order (that is, object weight, word order, and their interaction) as fixed effect predictors. This was a maximal random-effects structure, as recommended by Barr et al. (2013).[3]

Since the aim of our paper is to compare the behavior of subjects, the model estimates were used to construct word order effects for each subject, that is, estimates of each subject's preference for VOP and VPO order, in each condition. This was done by subtracting the random effect estimates (BLUPs) for the appropriate lexicalization from the normalized response. The resulting data included the modelÕs fixed effects, the subject random effects, and the residual error.[4]

Figure 1 shows, for each subject, the difference between VOP and VPO order (or the preference for VOP over VPO), with the subject's age represented on the x-axis. Trend lines for heavy and light object conditions for UK and US subjects are also shown.

Figure 1 replicates the effect of object weight discussed in the literature: heavy objects tend to be placed after the particle, while lighter objects tend to precede the particle (Kroch and Small, 1978; Gries, 2001; Lohse et al., 2004). In addition, the figure shows a difference between UK and US subjects; on average, UK subjects tend slightly toward VOP orders, while Americans prefer VPO orders. (See Haddican and Johnson (2012) for a discussion of this difference.) The slopes of the trend lines also show an age effect on word order preference. In both UK and US samples, younger speakers tend toward the VOP order. We return to this fact shortly.

More importantly for our purposes, Figure 1 shows that the object weight effect appears constant, as indicated by the relatively parallel trend lines for heavy and light objects. (The analysis returned no significant order * weight * age effect; p = .18.) The weight effect therefore seems to be constant in apparent time. In addition, the weight effect is constant between the UK and the US, with very similar slopes for the trend lines between the UK and US samples. (The analysis returned no significant effect for order * weight * country; p = .98) The constant weight effects shown in Figure 1 are predicted if cross-speaker and cross-dialectal variation in preference for VPO vs. VOP orders reflects variation in the probability of application of an abstract process— the movement operation responsible for the particle verb alternation—and probabilistic knowledge of contextual effects on this process, such as the effect of object weight, are acquired by learners independently.

A crucial question that arises from the perspective of this discussion is whether weight affects the acceptability of VPO and VOP orders independently in judgement tasks where these sentence types are treated as separate conditions. Previous acceptability judgment experiments have often enforced an inverse relationship between variants, for example by

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[3]The reason for dividing the data was because the full model with focus * weight * order did not converge. In any case, our results did not differ greatly from a model that simply ignored the focus variable.

[4]We adopted this approach after discovering that using the by-subject BLUPs directly yielded very inconsistent results.
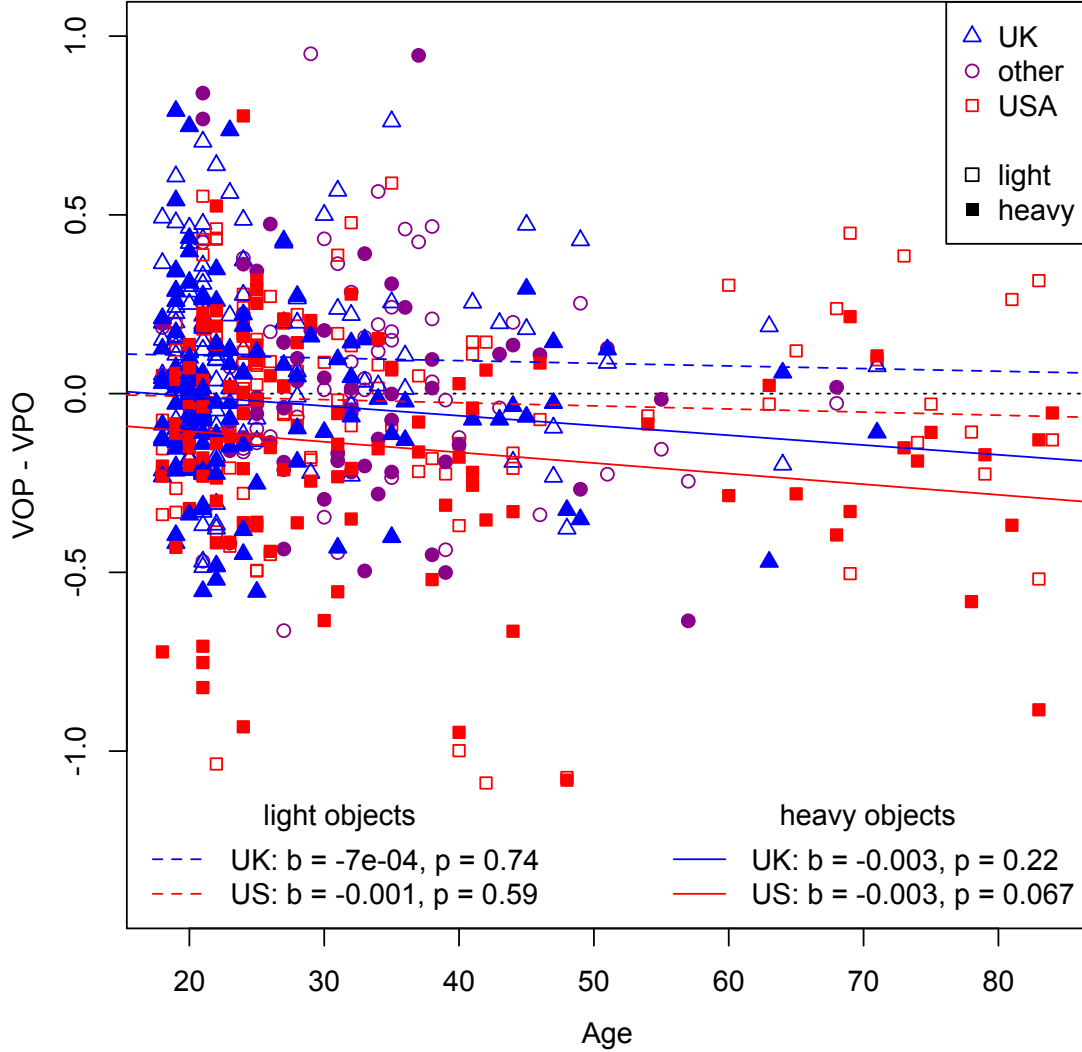
Figure 1: Estimated effects of object weight and word order on acceptability by speaker

asking subjects to divide 100 points between two alternative sentences (Bresnan and Ford, 2010). Comparisons of such results with corpus-based studies—where there is no question of measuring independent effects on variants—have suggested that relative acceptability in judgments does correspond to relative frequency of use in production.

Here, we attempt to measure the absolute acceptability of variants, and the potentially independent effects of contextual variables on those variants. In those cases where the inverse pattern still emerges—for a binary variable, anything that favors variant A disfavors variant B—this will support the view that constraints apply to the competition itself (and this also seems to provide a tool for determining which "ways of saying the same thing" (Labov 1972: 271) should be treated as a linguistic variable, a longstanding question in the study of variation "above the phonology").

In the particle verb data, the mirror pattern that emerges is only partial. Object weight affects both orders of the English particle verb alternation, but increasing the weight of the object from two to four words (or from three to seven syllables) disfavors the Verb-Object-Particle order about 50% more than it favors the Verb-Particle-Object order. We illustrate this in Table 1, showing the effects of weight on VOP and VPO orders. The greater effect of object weight in the VOP order is also reflected in the

greater distance between the two trend lines in the left panel of Figure (15) (VOP), compared to the right panel (VPO).

Object Weight	Verb-Object-Particle	Verb-Particle-Object
Light	0.618	0.575
Heavy	0.553	0.617
$|\Delta|$	0.065	0.042

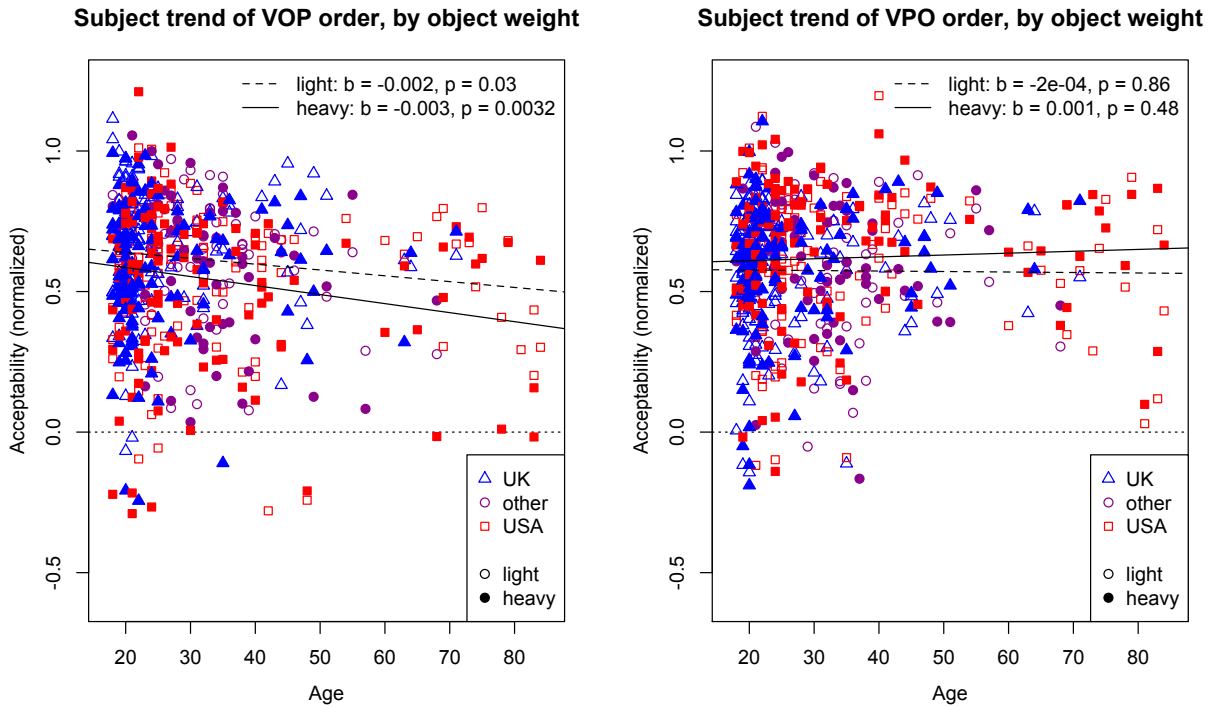Table 1: Average acceptability for four conditions

Figure 2: Estimated effects of object weight on acceptability of VOP and VPO orders by speaker

These results are partially explained by Lohse et al.'s (2004) processing-based account, where the weight effect is taken to reflect a preference by the processor to resolve dependency relations in a maximally local domain. Heavy objects are dispreferred in the VOP frame, according to this approach, because the object NP material intervening between the verb and its associated particle entails a "non-minimal domain" for processing (see also Hawkins (2004)).

However, the fact that object weight has an effect on VPO orders is unexpected from this perspective, since a larger object noun phrase in the VPO condition should have no effect at all on the size of the processing domain for the relevant dependency relation. In our experiment's VPO condition, "the smallest contiguous substring containing the verb, the particle, and the first constructing word in the object NP" (Lohse et al. 2004: 240) is the same length in both light and heavy conditions.

This suggests that when subjects evaluate the acceptability of a given syntactic structure, they may implicitly compare it with a competing structure in the same environment. That is, the well-motivated weight effect disfavoring heavy objects in the VOP order may lead to a preference for heavy objects in the VPO order. Subjects may evaluate the relative acceptability of both orders when they are exposed to either one of them, in a kind of perceptual version of competing grammars. At the same time, the fact that object weight has a smaller effect in the VPO condition may reflect it being parasitic on the effect in the VOP condition.

If the variants show a partially-inverse relationship on average, a clear independence between them is visible in diachrony. Over the twentieth century, in both the US and the UK, there was a slow shift in particle verb realization in the direction of the VOP order (Haddican and Johnson, 2012). Figure s shows that this shift has been driven almost entirely by an increase in the acceptability of the VOP order, without any concomitant decline in the acceptability of the VOP order. Relatedly (though not illustrated in Figure 2), the VOP order is clearly preferred in the UK compared to the US, while the VPO order has similar levels of acceptability in the two countries. (See Campbell-Kibler (2011) for similar evidence of the perceptual independence of variants in phonology.) Corpus studies must necessarily treat any change, like any constraint, as applying to the variable—to the relationship between variants. The present results from an judgement study, in which acceptability of the different variants are measured independently, suggests, instead that depending on the variable, or the constraint, speakers' base rates of variation, and the competition between the variants, may not be governed by a single abstract probability. Rather, probabilistic knowledge of contextual effects may be represented separately for separate variants. The results presented in this section, however, suggest that these effects are relatively constant across speakers, a result in keeping with Kroch's generalization.[5]

3   Shape conservation effects in Norwegian

The second experiment we discuss comes from a study on object ordering in Norwegian. Norwegian is a "symmetric passive" language, meaning that in passives of double object constructions, both theme and goal arguments may passivize, as illustrated in (9).

(9)   **Norwegian**
    a.   Jens ble gitt   bok-en.
         Jens was given book-the
         'Jens was given book-the.'
    b.   Bok-en   ble gitt   Jens.
         Book-the was given Jens.
         'Jens was given the book.'
         (Adapted from Haddican and Holmberg (2012))

In this respect, Norwegian differs from Danish—an "asymmetric passive" language— where only goal arguments may passivize in double object constructions:

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[5]To clarify, when we say a given effect is constant across the speakers in our study, we do not mean that the speakers display no variability. For one thing, our data is noisy, partially because of the rough 0-10 scale, and no amount of statistical manipulation can completely correct for this. A less rigorous operationalization of a "constant effect" on a variable is that the size of the effect should be statistically independent of a speaker's input probability. All the effects reported in this paper meet this criterion.

(10)   ***Danish***
    a.   Jens blev givet bog-en.
        Jens was given book-the
        'Jens was given book-the.'
    b. *Bog-en blev givet Jens.
        Jens was given book-the
        'Jens was given book-the.'
        (Holmberg and Platzack, 1995)

Anagnostopoulou (2003, 2005) proposed that the difference between Norwegian and Danish illustrated in (9) and (10) is relatable to a further difference between the two languages in terms of object ordering in object shift (OS) constructions in these languages. OS refers to contexts where weak pronominal objects—but not other VP material—raise out of the verb phrase. We illustrate this in (11) where the object pronoun raises out of the VP, to a position to the left of the negative adverbial, *ikke*.

(11)   Elsa så   den ikke [$_{VP}$ så den.]
    Elsa saw it   not
    'Elsa didn't see it.'

Importantly, OS in Scandinavian languages is restricted to contexts where the verb raises out of the VP as well—a restriction known as *Holmberg's Generalization* (Holmberg, 1986). (12), for example, shows that in perfect contexts, where the verb must remain inside the VP, OS is also blocked.

(12)   ***Holmberg's Generalization (HG)***
    a.   Elsa har ikke gitt   ham den.
        Elsa has not given him it
        'Elsa hasn't given him it.'
    b. *Elsa har ham den ikke [$_{VP}$ gitt   ham den.]
        Elsa has him it   not   given
        'Elsa hasn't given him it.'

In sentences with object shift, theme-goal orders are strictly disallowed in Danish, while in Norwegian, some speakers marginally allow for theme-goal orders, as illustrated in (13) and (14).

(13)   ***Danish double object OS***
    a.   Peter viste   hende den jo.
        Peter showed her   it   indeed
        'Peter indeed showed it to her.'
    b. *Peter viste   den hende jo.
        Peter showed it   her   indeed
        'Peter indeed showed it to her.'
        (Anagnostopoulou, 2005)

(14)   ***Norwegian double object OS***
    a.   Elsa ga   ham den ikke.
        Elsa gave him it   not
        'Elsa didn't give him it.'

    b. %Elsa ga   den ham ikke.
       Elsa gave it   him not
       'Elsa didn't give him it.'
       (Haddican and Holmberg, 2012)

Anagnostopoulou proposed that this cross-linguistic correlation in the availability of theme-goal orders in passives and OS has an abstract source: the same short theme movement responsible for theme-goal orders in OS constructions in Norwegian feeds passivization, as shown in (15). In Danish, where this short theme movement is not available, theme passivization is blocked by the intervening goal. On this approach, then, the unavailability of theme-passivization in asymmetric passive languages is explained as a locality effect.

(15)   ***Theme passivization on the locality approach***
      [$_{\text{TP}}$ Theme T [$_{\text{vP}}$ v [$_{\text{XP}}$ ~~Theme~~ [$_{\text{XP}}$ Goal [$_{\text{YP}}$ ~~Theme~~]]]]]

As Anagnostopoulou noted, acceptability of theme-goal orders varies across speakers of Norwegian. The above locality approach therefore makes a strong prediction about this cross-speaker variation: speakers should accept theme-goal orders in passives if and only if they also accept theme goal orders in OS. Below, we describe a judgment experiment designed to test this prediction.

    Subjects. Participants were 500 self-described native speakers of Norwegian, aged 18-81 (M=38.9, SD=11.5), 371 women and 129 men. Participants were recruited online and were not compensated. We did not require participants to be linguistically naive.

    Materials. The experiment was a 2x3 design crossing argument order (with levels *theme-goal* and *goal-theme*) with context (with levels *Passive*, *Active-OS* and *Active-non-OS*). The Active-non-OS condition was included to test Anagnostopoulou's (2003) claim that theme-goal orders are degraded in such contexts. We illustrate these six conditions in Table 2.

Context	theme-goal	goal-theme
Passives	Den ble gitt ham.	Han ble gitt den.
	'It was given him.'	'He was given it.'
Active OS	Elsa ga den ham ikke.	Elsa ga ham den ikke.
	'Elsa didn't give him it.'	'Elsa didn't give him it.'
Active-non-OS	Elsa har ikke gitt den ham.	Elsa har ikke gitt ham den.
	'Elsa hasn't given him it.'	'Elsa hasn't given him it.'

Table 2: Example sentences for six conditions

    All theme and goal arguments were third person pronouns. We biased theme vs. goal interpretation of the arguments using animate pronouns for goal arguments and inanimates for themes. Twelve lexicalizations were created for each of the conditions. These were then blocked and assigned to lists by Latin square. Each subject saw four items/condition, yielding 24 critical items, which were pseudo-randomized with 24 fillers, half of which were grammatical and half ungrammatical. Subjects were pseudo-randomly assigned to lists, using a counter mechanism.

    Procedure. Subjects judged the above materials in a self-paced, web-based survey in Spring 2013 using Ibex Farm (Drummond, 2013). Subjects judged each sentence one-by-one and were not permitted to view or rejudge previously judged items. Subjects rated

each sentence on an 11-point (0-10) scale by clicking an icon for a value ranging from 0 to 10 in a horizontal array, with endpoints labeled *dårlig* 'bad' and *god* 'good'. Results were normalized by converting to z-scores based on by-speaker means and standard deviations of fillers.

Results and discussion. Figure 3 plots mean scores and 95% confidence intervals for our six conditions. Zero on the y-axis corresponds to the mean scores for the fillers, half of which, again, were grammatical and half ungrammatical. Zero on the y-axis might therefore be taken as a rough midpoint of acceptability. The figure shows that theme-goal orders are quite bad in the active conditions. They are particularly degraded in the Active-non-OS condition (Anagnostopoulou, 2003), the same environment where goal-theme orders are rated highest, an effect which we return to shortly. In the object shift condition, goal-theme orders are rated somewhat lower and theme-goal orders are less sharply degraded. In passives, theme-goal orders were judged much better than in the other contexts—substantially better, in fact, than goal-theme orders.
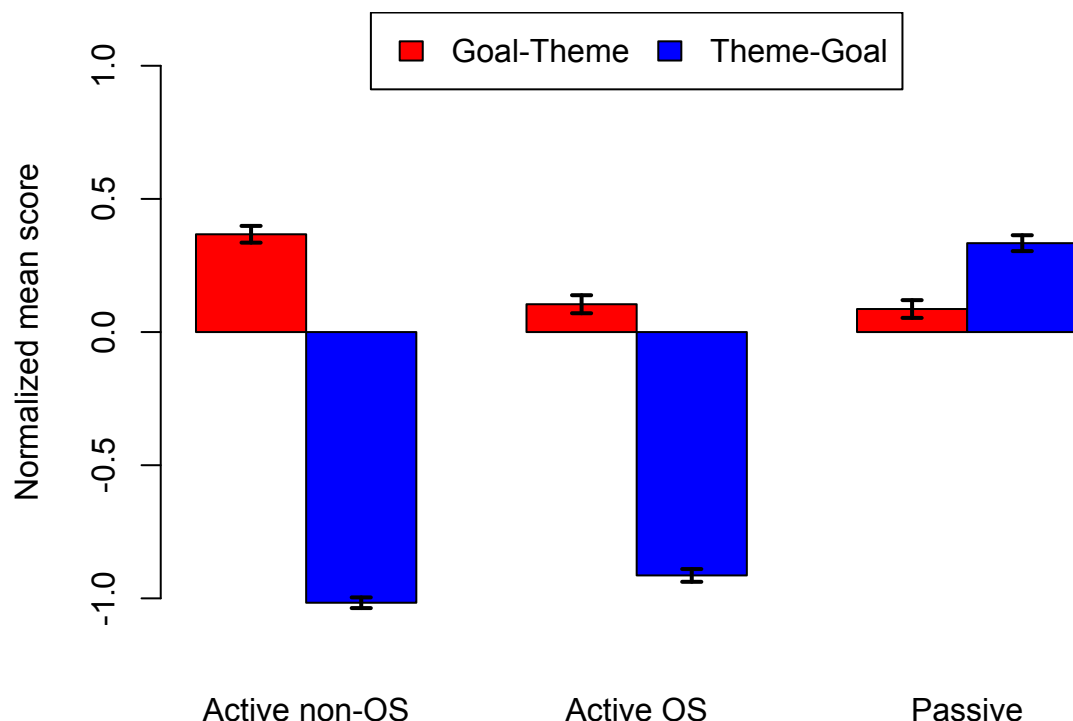

Figure 3: Mean scores and 95% CIs for six conditions

Figure 4 plots the difference between subjects' judgments of theme-goal and goal-theme orders, for two pairs of contexts. The x-axis shows each subject's word-order preference in the Active-non-OS context. The y-axis shows the same for the Active-OS context (in blue) and the Passive context (in red). The blue triangles, therefore, show the correlation of word-order preferences between Active-non-OS and Active-OS sentences, and the red triangles show the correlation between Active-non-OS sentences and Passive sentences. There is a fairly high positive correlation ($+0.570$) between the two active contexts, and no significant correlation between the Active-non-OS and Passive contexts.

Figure 4 therefore suggests that an individual's acceptance of theme-goal orders in Active-non-OS contexts is a poor predictor of their acceptance of theme-goal order in
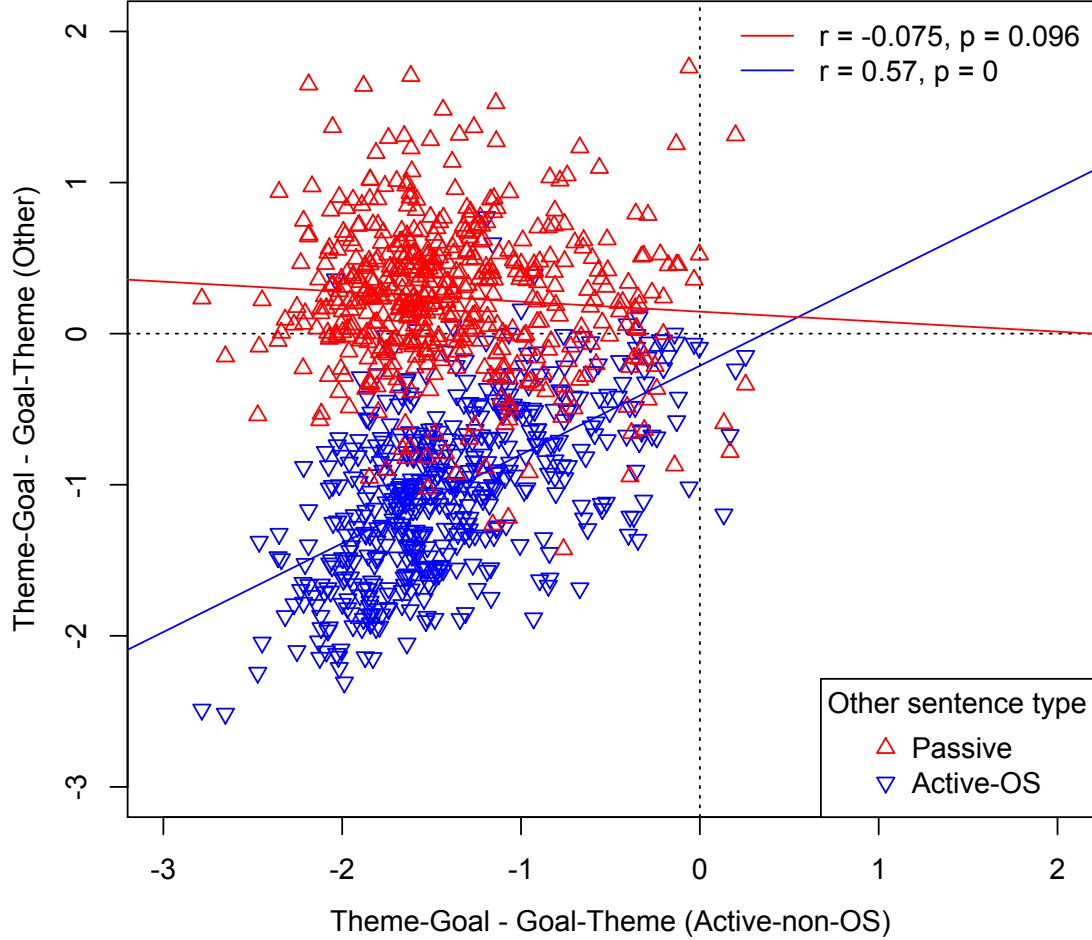
Figure 4: Theme-goal order in Passives and Active OS contexts compared to Active-non-OS sentences

passives, contra the locality approach discussed above. The results, however, do suggest a relationship between the acceptance of theme-goal orders in the two active contexts. Haddican and Holmberg (2014) suggest that this is an order preservation effect, whereby certain movement operations—OS, in this case—may not change the linear order of syntactic objects established at a prior level (Sells, 2001; Richards, 2004; Fox and Pesetsky, 2005; Engels and Vikner, 2013). Specifically, Haddican and Holmberg (2014) propose that the same VP-internal movement operation responsible for theme-goal orders in Active-non-OS contexts also feeds OS. The cross-speaker correlation in scores for these two environments reflects this fact. To the extent that speakers allow the movement operation, they will also allow theme-goal orders in OS; to the extent the movement is unavailable, theme-goal orders in OS will also be blocked. Importantly, this object order preservation effect applies in the same environments (OS contexts) as Holmberg's generalization effects, which preserves the relative order of verbs and objects (see (12), above).

The importance of these results for Kroch's generalization is that they indicate stability in contextual effects on judgments across speakers, although acceptance of the abstract rule—a VP-internal movement operation according to Haddican and Holmberg (2014)—varies considerably across speakers. This is precisely the pattern expected if, as Kroch suggests, learners within a given dialect/community faithfully acquire probabilities over contextual conditions on the use of abstract forms.

Recall from the discussion of the particle verb data that the effect of weight on acceptance of VPO orders *partially* mirrors that in VOP order: relative to light objects, heavy objects disfavor VOP orders and favor VPO orders, but the former effect is stronger than the latter. A question that arises in this light is whether acceptance of goal-theme and theme-goal word orders are affected differently by OS. Table 3, which summarizes the effects on OS in theme-goal and goal-theme contexts, shows that these effects are in a mirroring relationship with a greater asymmetry: object shift disfavors the goal-theme order more than twice as strongly than it favors the theme-goal order.

Context	Theme-Goal	Goal-Theme
Active OS	-0.914	0.115
Active-non-OS	-1.017	0.373
$|\Delta|$	0.103	0.258

Table 3: Average acceptability for four conditions

In discussing the degradation of theme-goal orders in non-OS contexts compared to OS contexts, Anagnostopoulou (2003) proposes that short theme movement responsible for theme-goal orders is only licit when it feeds a subsequent movement step, OS or passivization (see also Richards (**?**:127-162).) The results summarized in figure 4 does not support this Anagnostopoulou's description, since many subjects in our sample accept theme-goal orders to a degree in active non-OS contexts. The fact that theme-goal orders are *relatively* worse in non-OS contexts than OS contexts is in line with Anagnostopoulou's proposal. Whatever the nature of this effect on theme-goal orders in non-OS contexts, it bears observing that it co-occurs with a stronger *increase* in acceptability of the competing word order—Goal-Theme. The fact that the effect of OS on Goal-Theme orders is the reverse of that for Theme-Goal orders, again suggests that subjects may judge structures in light of contextual restrictions on competing variants. Unlike the object weight effect on particle verbs, whose greater effect on the VOP order had a principled explanation, the fact that the effect of OS should be stronger for goal-theme orders than theme-goal orders is something we cannot account for here.

In the particle verb experiment, younger subjects gave more favorable judgments to the VOP order, while judgments of the VPO order were surprisingly stable (Figure). An age effect was also observed for the Norwegian experiment, in the Passive condition. Figure 5 shows that as goal-theme orders are judged worse among younger speakers, theme-goal orders are judged better. The size of the age effect is similar for both conditions, as shown by the trend lines (the absolute values of the trends are not significantly different; p = .26).

To summarize, we have seen several pieces of evidence of a "competing grammars" effect in judgment data. In both the particle verb data and the Norwegian object ordering data, between-subjects and within-subjects effects on one variant may be mirrored by effects on the competing variant. This effect is explained if subjects implicitly judge syntactic variants as an alternative to competitor variants in a given context. Importantly, these effects seem not to apply to both variants in the same way; the effects are opposite, but not always equal (in fact, one effect can be close to nonexistent). We suggest that in some cases, the larger effect may have an principled explanation, while the other effect is merely derivative. The extent to which these phenomena are found more
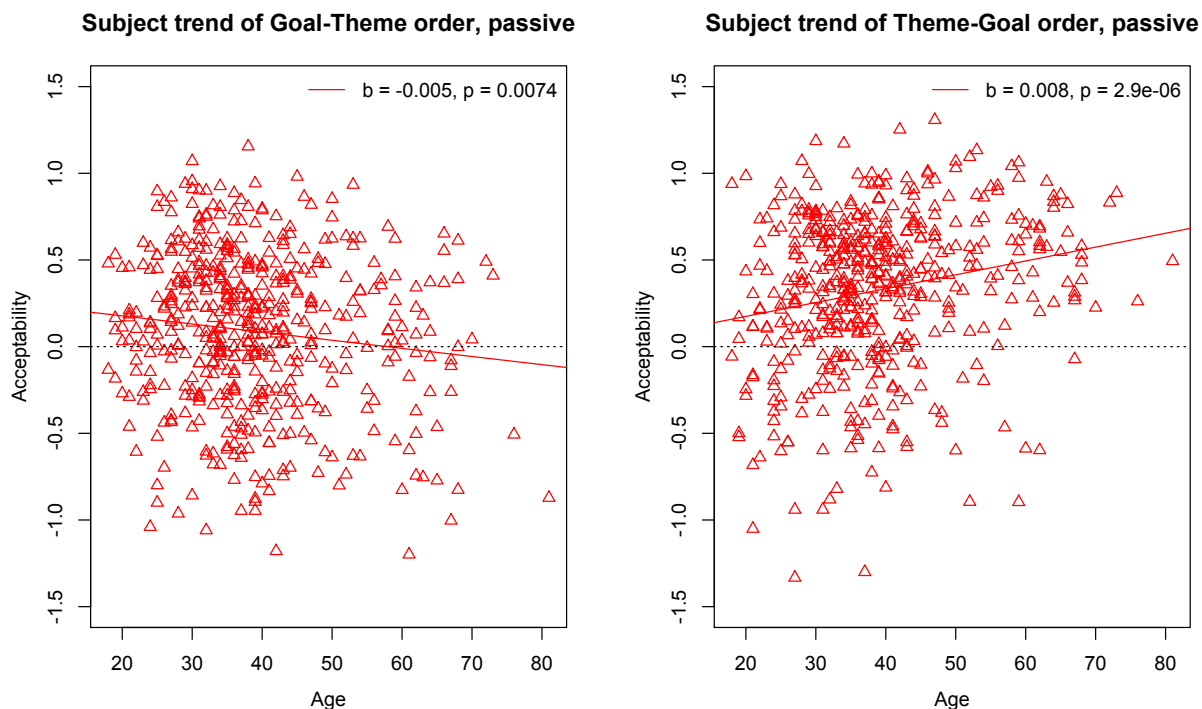
Figure 5: Acceptability of goal-theme and theme-goal word orders in Passive contexts by speaker

generally in judgment data, and how and why effects on different variants may come to be independent, might usefully be examined in future research.

4 Conclusion

Kroch's generalization about the constancy of conditioning effects in production data originally held the promise of a new kind of data capable of informing formal analysis by equipping formalists "to refine grammatical analyses on the basis of the predictions they make about the patterning of usage in change" (Kroch 1989). In practice, the application of this technique to formal issues has been fairly limited owing to the difficulty of finding appropriate corpora, and the time required to analyze such data. In addition, identifying the intended interpretation of a given string in production data may add uncertainty to formal analyses of usage data.

In this paper, we have argued that controlled judgment experiments provide an additional technique for inferring a single abstract source for superficially different forms, using Kroch's generalization. Recent advances in techniques for carrying out web-based experiments now make such experiments relatively easy to implement. Future work in comparative syntax might therefore avail itself of these new techniques.

References

Anagnostopoulou, E., 2003. The syntax of ditransitives: Evidence from clitics. Walter de Gruyter, Berlin.

Anagnostopoulou, E., 2005. Holmberg's generalization and cyclic linearization. Remarks on Fox and Pesetsky. Theoretical Linguistics 31, 95–110.

Ball, C. N., 1994. Relative pronouns in *it*-clefts: The last seven centuries. Language Variation and Change 6, 179–200.

Barr, D. J., Levy, R., Scheepers, C., Tily, H. J., 2013. Random effects structure for confirmatory hypothesis testing: Keep it maximal. Journal of Memory and Language 68, 255–278.

Bolinger, D. L. M., 1971. The phrasal verb in English. Harvard University Press Cambridge, MA.

Bresnan, J., Ford, M., 2010. Predicting syntax: Processing dative constructions in American and Australian varieties of English. Language 86, 168–213.

Campbell-Kibler, K., 2011. The sociolinguistic variant as a carrier of social meaning. Language Variation and Change 22, 423–441.

Cukor-Avila, P., 2002. *She say, she go, she be like*: Verbs of quotation over time in African American Vernacular English. American Speech 77, 3–31.

Dehé, N., 2002. Particle verbs in English: syntax, information structure and intonation. John Benjamins Publishing Company, Amsterdam.

Den Dikken, M., 1995. Particles. Oxford University Press on Demand.

Den Dikken, M., 2010. On the functional structure of locative and directional PPs. In: Cinque, G., Rizzi, L. (Eds.), Mapping Spatial PPs. Oxford University Press, Oxford, pp. 74–126.

Drummond, A., 2013. Ibex Farm,.

Durham, M., Haddican, B., Zweig, E., Johnson, D. E., Baker, Z., Cockeram, D., Danks, E., Tyler, L., 2011. Constant linguistic effects in the diffusion of *be like*. Journal of English Linguistics , 316–337.

Elenbaas, M. B., 2007. The synchronic and diachronic syntax of the English verb-particle combination, vol. 149. LOT.

Engels, E., Vikner, S., 2013. Object shift and remnant VP-topicalisation: Danish and Swedish verb particles and ÔletÕ-causatives. Nordic Journal of Linguistics 36, 219–244.

Fox, D., Pesetsky, D., 2005. Cyclic linearization of syntactic structure. Theoretical Linguistics 31, 1–45.

Fruehwald, J., Gress-Wright, J., Wallenberg, J., 2009. Phonological rule change: The constant rate effect. In: Proceedings of NELS, vol. 40.

Gries, S. T., 2001. A multifactorial analysis of syntactic variation: particle movement revisited. Journal of Quantitative Linguistics 8, 33–50.

Guy, G., 1980. Variation in the group and the individual: The case of final stop deletion. In: Labov, W. (Ed.), Locating language in time and space. Academic Press, pp. 1–36.

Guy, G., 2007. The scope of generalization in phonology.

Haddican, B., Holmberg, A., 2012. Object movement symmetries in British English dialects: Experimental evidence for a mixed case/locality approach. The Journal of Comparative Germanic Linguistics , 1–24.

Haddican, B., Holmberg, A., 2014. Four kinds of object symmetry. In: Veselovská, L., Janebová, M. (Eds.), Complex Visibles Out There. Proceedings of the Olomouc Linguistics Colloquium 2014: Language Use and Linguistic Structure. Palacký University.

Haddican, B., Johnson, D. E., 2012. Effects on the particle verb alternation across English dialects. University of Pennsylvania Working Papers in Linguistics 18, 5.

Haddican, B., Johnson, D. E., 2014. Focus effects on particle placement in English and the left periphery of PP. Proceedings of NELS 43 .

Hawkins, J. A., 2004. Efficiency and complexity in grammars. Oxford University Press Oxford.

Holmberg, A., 1986. Word order and Syntactic features. Ph.D. thesis, Stockholm University.

Holmberg, A., Platzack, C., 1995. The role of inflection in Scandinavian syntax. Oxford University Press, Oxford.

Hughes, A., Trudgill, P., Watt, D., 2005. English accents and dialects: An introduction to social and regional varieties of English in the British Isles. Hodder Arnold, London.

Johnson, K., 1991. Object positions. Natural Language & Linguistic Theory 9, 577–636.

Kallel, A., 2007. The loss of negative concord in Standard English: Internal factors. Language Variation and Change 19, 27–49.

Kayne, R., 1985. Principles of particle constructions. In: Guéron, J., Obenauer, H.-G., Pollock, J.-Y. (Eds.), Grammatical representation. Foris Dordrecht, The Netherlands, pp. 101–140.

Kayne, R. S., 1998. Overt vs. covert movements. Syntax 1, 128–191.

Kroch, A., 1989. Reflexes of grammar in patterns of language change. Language variation and change 1, 199–244.

Kroch, A., 1994. Morphosyntactic variation. In: Beals, K. (Ed.), Papers from the 30th regional meeting of the Chicago Linguistics Society: Parasession on variation and linguistic theory. Chicago Linguistics Society, Chicago. Chicago Linguistic Society.

Kroch, A., Small, C., 1978. Grammatical ideology and its effect on speech. In: Sankoff, D. (Ed.), Linguistic variation: models and methods. Academic Press, New York, NY, pp. 45–55.

Labov, W., 1972. Sociolinguistic patterns. 4, University of Pennsylvania Press.

Lohse, B., Hawkins, J. A., Wasow, T., 2004. Domain minimization in the English verb-particle constructions. Language 80, 238–261.

Melnick, R., Jaeger, T. F., Wasow, T., 2011. Speakers employ fine-grained probabilistic knowledge. LSA, Pittsburgh, PA .

Pintzuk, S., 1999. Phrase structures in competition: Variation and change in Old English word order, vol. 43. Routledge, London.

Richards, M., 2004. Object shift and scrambling in North and West Germanic: A case study in symmetrical syntax. Ph.D. thesis, University of Cambridge.

Santorini, B., 1993. The rate of phrase structure change in the history of Yiddish. Language Variation and Change 5, 257–283.

Sells, P., 2001. Structure, alignment and optimality in Swedish. CSLI.

Svenonius, P., 1996. The optionality of particle shift. Working papers in Scandinavian syntax 57, 47–75.

Svenonius, P., 2010. Spatial P in English. In: Cinque, G., Rizzi, L. (Eds.), Mapping spatial PPs. Oxford University Press, Oxford, pp. 127–160.

Tortora, C., den Dikken, M., 2010. Subject agreement variation: Support for the configurational approach. Lingua 120, 1089–1108.